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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,565	09/12/2003	Howard Rhodes	M4065.0570/P570-A	5308

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EXAMINER	
ARENA, ANDREW OWENS	
ART UNIT	**PAPER NUMBER**
2811	

MAIL DATE	DELIVERY MODE
01/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/660,565	RHODES ET AL.	
	Examiner	Art Unit	
	Andrew O. Arena	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *90,93-125 and 128-141* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *90,93-125 and 128-136* is/are allowed.

6)☒ Claim(s) *137-141* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

LYNNE GURLEY
SUPERVISORY PATENT EXAMINER
AU2811, TC 2800

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *OCT 25 2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

Claims 137-141 are rejected under 35 U.S.C. 103(a) as being obvious in view of Rhodes (US 6,204,524) and Lauxtermann (US 2001/0015831).

RE claim 137, Rhodes discloses (Fig 6-14) a method of forming an imager (col 8 ln 28-30) comprising the steps of:

providing a semiconductor substrate (116+120; col 8 ln 30-32) having a doped layer (120) of a first conductivity type (col 8 ln 32-33);

forming a field oxide region (115; col 7 ln 25-28) in said semiconductor substrate;

forming a photosensor (Fig 5: 125, col 7 ln 36-37; col 8 ln 45 – col 9 ln 25) including a charge collection region (region of 155/110/126) of a second conductivity type (col 7 ln 31-33), said charge collection region being provided in said doped layer (col 7 ln 30-31), said charge collection region being adjacent one side (left) of a gate of a pixel transistor (128; col 7 ln 37-38);

forming a floating diffusion region (130; col 7 ln 41-43, col 9 ln 8-17) for receiving charge (accumulated: col 7 ln 46-48) from said charge collection region (by way of transfer transistor 128: col 7 ln 37-38), said floating diffusion region being connected to said gate of said pixel transistor (128) and being adjacent another side (right) of said gate (of 128) opposite said charge collection region (155/110/126); and

directly connecting an electrode (156) of a {second} charge storage capacitor (Fig 5: 162; col 9 ln 36-37) to said charge collection region (at 155) by a {second} electrical contact (150; col 7 ln 61-64).

Rhodes differs from the claimed invention only in not disclosing "connecting an electrode of a first charge storage capacitor to said floating diffusion region."

Lauxtermann discloses (Fig 2B) an analogous CMOS imager (¶1) comprising: a photosensor (PD; ¶6 ln 5) and a floating (no fixed potential) diffusion region (55; ¶7 ln 6) for receiving charge from said photosensor (¶6 ln 7-11) adjacent opposite sides of a gate of a pixel transistor (M2; ¶8 ln 3); and one electrode of a charge storage capacitor (C1; ¶6 ln 10-11) is connected directly to said floating diffusion region by an electrical contact to allow separation of the detection and reading processes (¶6 ln 17-19).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Rhodes in view of Lauxtermann by forming a first charge storage capacitor over said semiconductor substrate using the method taught by Rhodes and then connecting an electrode of said first charge storage capacitor to said floating diffusion region by a first electrical contact; at least to allow separation of the detection and reading processes.

RE claim 138, Rhodes as modified discloses said first charge storage capacitor is formed such that the extent of said charge storage capacitor overlies said field oxide region (no portion lies under 115).

RE claim 139, Rhodes as modified discloses a first portion of said first charge storage capacitor is formed over said field oxide region (no portion lies under 115), and a second portion of said first charge storage capacitor is formed over an active area of said photosensor (no portion lies under 125).

RE claim 140, Rhodes as modified discloses said second charge storage capacitor is formed such that the extent of said charge storage capacitor overlies said field oxide region (no portion lies under 115).

RE claim 141, Rhodes as modified discloses a first portion of said second charge storage capacitor is formed over said field oxide region (no portion lies under 115), and a second portion of said second charge storage capacitor is formed over an active area of said photosensor (no portion lies under 125).

Response to Arguments

The arguments filed 10/31/2007 regarding claims 122-125, 128 & 129 have been fully considered and are persuasive; the rejections thereof have been withdrawn.

The arguments filed 10/31/2007 regarding claims 137-141 have been fully considered but are not persuasive.

Rhodes teaches one capacitor directly connected to the charge collection region for the advantage of improving collection capacity (col 5 ln 47-59). Lauxtermann teaches a nearly-identical device having one capacitor directly connected to the floating diffusion region for the advantage of separating the detection and reading processes (¶6 ln 17-19). The references as a whole suggest the desirability of the claimed invention including two capacitor for two purposes, the sheer similarity of devices provides a reasonable expectation of success. See MPEP § 2141(II).

Allowable Subject Matter

Claims 90, 93-125 and 128-136 are allowed.

Allowable subject matter has been indicated because the references of record, alone or in combination, do not teach or fairly suggest the following limitations:

the entire extent of said charge storage capacitor is within said lateral boundaries of said field oxide region, as required by claims 90, 93-121 and 130-136; or

the other electrode of said storage capacitor is connected directly to a gate of another transistor, as required by claims 122-125, 128 and 129.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571- 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more info about PAIR, see http://pair-direct.uspto.gov. For questions PAIR access, contact the Electronic Business Center at 866-217-9197 (toll-free). For assistance from a USPTO Customer Service Rep or access to the automated info system, call 800-786-9199 or 571-272-1000.

Andrew O. Arena
4 January 2008

LYNNE GURLEY
SUPERVISORY PATENT EXAMINER
AU 2811, TC 2800